

AF 2813

Attorney Docket No. 0756-2178

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Shunpei YAMAZAKI

Serial No. 09/619,477

Filed: July 19, 2000

For: CONTACT STRUCTURE AND
SEMICONDUCTOR DEVICE

) Group Art Unit: 2813

) Examiner: E. Kielin

) CERTIFICATE OF MAILING

) I hereby certify that this correspondence is being
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) P.O. Box 1450, Alexandria, VA 22313-1450, on
) January 14, 2003.

Rose M. Gidycz

RESPONSE

Honorable Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Official Action mailed October 14, 2003, has been received and its contents carefully noted. This response is filed within three months of the mailing date of the Official Action and therefore is believed to be timely without extension of time. Accordingly, the Applicants respectfully submit that this response is being timely filed.

Claims 1-10, 12-33, 35-44 and 46-56 are pending in the present application, of which claims 1, 10, 19, 31 and 43 are independent. Claims 1-10, 12-30 and 54 have been withdrawn from consideration. Accordingly, claims 31-33, 35-44, 46-53, 55 and 56 are currently elected, of which claims 31 and 43 are independent. For the reasons set forth in detail below, all claims are believed to be in condition for allowance. Favorable reconsideration is requested.

Paragraphs 2-10 of the Official Action reject claims 31-33, 35-44, 46-53, 55 and 56 as obvious based on the combination of JP 9-251996 to Yamazaki et al. with one or more of the following: U.S. Patent No. 6,169,593 to Kanaya et al., U.S. Patent No. 5,636,329 to Sukegawa et al., and U.S. Patent 5,608,559 to Inada et al. The Official Action also relies on U.S. Patent No. 5,821,159 to Ukita, U.S. Patent 6,215,077 to

Utsumi et al., and JP 8-234212 to Hioki to allegedly teach the features of some of the dependent claims of the present invention. The Applicants respectfully traverse the rejection because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2142-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

Also, MPEP § 2142 states that the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be used together, it is submitted that the Official Action does not adequately set forth why one of skill in the art would combine the references to achieve the present invention.

There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Yamazaki

'996, Kanaya, Sukegawa, Inada, Ukita, Utsumi and Hioki or to combine reference teachings to achieve the claimed invention.

The Official Action concedes that Kanaya, Sukegawa and Inada do not teach "that the wiring has a tapered shape" (pages 3, 5 and 6, respectively, Paper No. 18). The Official Action relies on Yamazaki '996 to allegedly teach "that contact holes are conventionally required to be tapered to improve the step coverage of upper-layer wiring lines at contact holes" (Id.). The Official Action asserts that "it would have been obvious for one of ordinary skill in the art, at the time of invention to form the connecting wiring of [either Kanaya, Sukegawa or Inada] to have a tapered shape, as taught in Yamazaki because Yamazaki teaches that tapering is conventional and required to improve step coverage" (Id.). The Applicants respectfully disagree and traverse the above assertions in the Official Action.

In fact, Kanaya, Sukegawa and Inada teach wirings covered with insulating films. On the other hand, Yamazaki '996 only teaches an interlayer insulating film having a contact hole covered with a wiring (please note, the wiring covers the insulating film having a contact hole). As noted above, the Official Action asserts as motivation that Yamazaki '996 teaches "that contact holes are conventionally required to be tapered to improve the step coverage of upper-layer wiring lines at contact holes." However, Yamazaki '996 only teaches that the improvement of the step coverage is true for the interlayer insulating film having a contact hole covered with a wiring, not for wirings covered with insulating films. Since Yamazaki '996 is not concerned with wirings covered with insulating films, it is unclear why one of ordinary skill in the art at the time of the invention would have been motivated to apply the teachings of Yamazaki '996 to the devices of Kanaya, Sukegawa or Inada. Therefore, the Applicants believe that there is insufficient motivation or suggestion for combining Yamazaki '996 either with Kanaya, Sukegawa or Inada.

Ukita, Utsumi and Hioki do not cure the deficiencies in the alleged motivation to combine Yamazaki '996 either with Kanaya, Sukegawa or Inada. The Official Action

relies on Ukita to allegedly teach a laminate of a tungsten and its nitride for an interconnection wiring (pages 7 and 10, Id.), on Utsumi to allegedly teach a metallic film comprising aluminum and IZO (pages 8 and 11, Id.), and on Hioki to allegedly teach column-shaped spacers over TFTs using a resin (page 9, Id.). Ukita, Utsumi and Hioki do not teach or suggest that it would have been obvious at the time of the invention to apply the teachings of Yamazaki '996, which teaches a wiring over an interlayer insulating film having a contact hole, to either Kanaya, Sukegawa or Inada, which teach an insulating film over wiring.

Even assuming motivation could be found, the Official Action has not given any indication that one with ordinary skill in the art at the time of the invention would have had a reasonable expectation of success when combining Yamazaki '996, Kanaya, Sukegawa, Inada, Ukita, Utsumi and Hioki.

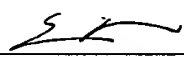
The Applicants further contend that even assuming, *arguendo*, that the combination of Yamazaki '996, Kanaya, Sukegawa, Inada, Ukita, Utsumi and Hioki is proper, there is a lack of suggestion as to why a skilled artisan would use the proposed modifications to achieve the unobvious advantages first recognized by the Applicants. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the present application, it is respectfully submitted that the prior art of record, alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact the Applicants' undersigned attorney at the telephone number listed below.

Respectfully submitted,



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